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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Farrell Docket No: TI-33431
Serial No: 10/034,788 Examiner: Fox, Charles
Filed: 12/27/2001 Art Unit: 3652
For: BI-DIRECTIONAL WAFER TRANSFER MECHANISM AND METHOD

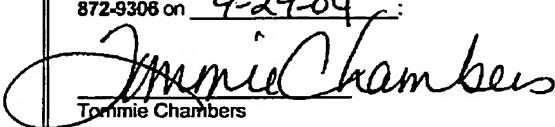
APPEAL BRIEF PURSUANT TO 1,192(c)

Assistant Commissioner for Patents
Washington, DC 20231

Dear Sir:

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Tommie Chambers

The following Appeal Brief is respectfully submitted in connection with the above identified application in response to the final Office Action mailed April 20, 2004, and the Advisory Action mailed July 29, 2004.

REAL PARTY IN INTEREST

The real party in interest is Texas Instruments Incorporated.

RELATED APPEALS AND INTERFERENCES

Appellant's legal representative knows of no appeals or interferences which will be directly affected, or have a bearing on the Board's decision.

STATUS OF THE CLAIMS

Claims 1-16 were originally filed with Claims 1, 2, 13, and 16 standing cancelled.

Claims 3-12, 14, and 15 are the subject matter of the instant appeal.

STATUS OF AMENDMENTS

The application was originally filed with Claims 1-16.

By virtue of an amendment filed on January 30, 2004, Appellants have cancelled Claims 1, 2, 13, and 16. Additionally, an amendment after final was filed on June 24, 2004, amending no claims. The Advisory Action indicated that the after final amendment would be entered.

SUMMARY OF THE CLAIMED SUBJECT MATTER

As shown in Figure 1, the present invention provides a wafer transfer machine for transferring wafers from either of a first wafer cassette (55) and a second wafer cassette (56), especially if they have incompatible registration features, into the other wafer cassette. The described wafer transfer machine includes a support plate or structure (30) having a support surface (38) for supporting the first and second wafer cassette. A first registration feature (44) is attached in fixed relationship to the support surface for engaging a registration feature of the first wafer cassette, and a second registration feature (42) is attached in fixed relationship to the top surface for engaging a registration feature of the second wafer cassette. A carriage (1) is supported by and is movable in opposite directions along a track mechanism (41A,B) that is attached in fixed relationship to the support plate (30). A first wafer pushing member (10A) is rigidly connected to the carriage (1) for engaging edges of semiconductor wafers in the first wafer cassette (55) and pushing them out of the first wafer cassette (55) into the second

wafer cassette (56). A second wafer pushing member (10B) also is rigidly connected to the carriage (1) for engaging edges of semiconductor wafers in the second wafer cassette (56) and pushing them out of the second wafer cassette (56) into the first wafer cassette (55).

A handle (5) is attached to the carriage for manually moving the carriage along the track mechanism to cause one of the first and second wafer pushing members to push wafers from one of the first and second wafer cassettes into the other. An alignment knob (43) is attached to an edge of the support structure (30) in a location aligned with the handle (5) when the carriage is located at a center position which allows placing of the first and second wafer cassettes in engagement with the first and second registration features, respectively, and allows removal of the first and second wafer cassettes from the support structure. The track mechanism includes first (41A) and second (41B) slide rods, and the carriage (1) includes parallel first (6) and second (8) bores through which the first and second slide rods, respectively, extend to allow bidirectional sliding of the carriage along the first and second slide rods. The support plate (30) includes a first elongated slot (31) through which the first wafer pushing member (10A) extends upward to a level of wafers supported in the first wafer cassette (55) and a second elongated slot (32) through which the first wafer pushing member (10B) extends upward to a level of wafers supported in the second wafer cassette (56). The first and second wafer pushing members are supported by opposite ends of a push-pull rod (40) extending through the third cylindrical hole (7) of the carriage (1) and rigidly attached to the carriage. In the described embodiment, first (20A), second (20B), third (20C), and fourth (20D) legs support first, second, third, and fourth corner portions of the support plate (30), respectively, wherein opposite ends of the first slide rod (41A) engage and are supported by the first (20A) and fourth (20D) legs, respectively, and wherein opposite ends of the second slide rod (41B) engage and are supported by the second (20B) and third (20C) legs, respectively.

In operation, the carriage (1) is moved in a direction that causes one of the first wafer pushing member (10A) and the second wafer pushing member (10B) which is

closest to the semiconductor wafers in the loaded wafer cassette to engage the edges of the semiconductor wafers and push them out of the loaded wafer cassette into the empty wafer cassette. Then the carriage is moved to a centered position that allows removal of the first and second wafer cassettes from the support plate.

Thus, the invention provides a single low cost wafer transfer machine of relatively simple construction which is capable of bidirectional transfer of wafers between two cassettes having incompatible registration features, such as a high temperature aluminum wafer cassette and a low temperature Teflon wafer cassette. The invention therefore avoids the expense, inconvenience, and space required to use two separate wafer transfer machines to accomplish transfer of wafers in either direction between two different kinds of cassettes having incompatible registration features.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The two issues to be reviewed on appeal are first whether Claims 3, 5-10, 12, 14, and 15 are unpatentable under 35 U.S.C. § 103 over Nichols '575 and Nichols '662 and secondly whether Claims 4 and 7 are unpatentable under 35 U.S.C. § 103 over Nichols '575 and Nichols '662 in view of De Luna.

ARGUMENTS

Claims 3, 5-10, 12, 14, and 15 are patentable under 35 U.S.C. § 103 over Nichols '575 and Nichols '662; and Claims 4 and 11 are patentable under 35 U.S.C. § 103 as being unpatentable over Nichols '575 and Nichols '662 in view of De Luna.

It is respectfully submitted that Nichols '575 does not disclose or suggest the presently claimed invention including wherein the first registration feature is incompatible with the second registration feature in independent Claims 3 and 14.

The Examiner alleges that Nichols '575 discloses a first registration feature 20 and a second registration feature 22.

Notwithstanding the allegations of the Examiner, there is nothing to indicate in Nichols '575 that indicates that these two features are incompatible.

The Honorable Board's attention is directed to page 2, line 7 of the instant application. Here, Applicants found that there is a known anodized aluminum wafer cassette for high-temperature wafer processing manufactured by Advanced Semiconductor Manufacturing referred to as ASM high-temperature cassette specifically designed for high-temperature wafer processing in certain reactors manufactured by the same company. In some instances, it is desirable to use these high-temperature anodized aluminum wafer cassette for carrying semiconductor wafers during high-temperature processing operations and to use "semi-standard" PFA Teflon cassettes "Teflon cassettes" for carrying the same wafers during other low temperature operations. However, these PFA Teflon cassettes and the ASM high-temperature cassettes have different registration features. As a consequence, the ASM high-temperature cassettes cannot be used in any single available wafer transfer machine to transfer semiconductor wafers from either the "semi-standard" PFA Teflon cassettes into the ASM high-temperature cassettes or vice versa. Instead, two separate wafer transfer machines are required.

The reference to Nichols could not achieve this advantage.

Nichols '662 does not cure these defects. In particular, Nichols '662 does not disclose or suggest the presently claimed invention including the first registration feature being incompatible with the second registration feature as defined in independent Claims 3 and 14.

Nichols '662 discloses a larger wafer carrier and a smaller wafer carrier.

Similar to Nichols '575, nothing in Nichols '662 discloses the presently claimed invention.

Whether or not De Luna discloses a handle for moving a pushing member and whether it would have been obvious to one of ordinary skill in the art is of no moment since the resulting construction would no way disclose or suggest the presently claimed invention.

CONCLUSION

For the foregoing reasons, Appellants respectfully submit that the Examiner's final rejection of Claims 3-12, 14, and 15 under 35 U.S.C. § 103 is not properly founded in law, and it is respectfully requested that the Board of Patent Appeals and Interferences so find and reverse the Examiner's rejections.

To the extent necessary, the Appellants petition for an Extension of Time under 37 CFR 1.136. Please charge any fees in connection with the filing of this paper, including extension of time fees, to the deposit account of Texas Instruments Incorporated, Account No. 20-0668.

Respectfully submitted,



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APPENDIX

Claims 1 and 2 (cancelled).

Claim 3 (previously presented): A wafer transfer machine for transferring wafers from either of a first wafer cassette and a second wafer cassette having incompatible registration features into the other, comprising:

- (a) a support plate having a top surface for supporting the first and second wafer cassettes;
- (b) a first registration boss attached to the top surface for extending upward into and engaging a first registration feature of the first wafer cassette, and a second registration boss attached to the top surface for extending upward into and engaging a second registration feature of the second wafer cassette,
wherein said first registration feature is incompatible with said second registration feature;
- (c) a carriage supported by and movable in opposite directions along a track mechanism that is attached in fixed relationship to the support plate; and
- (d) a first wafer pushing member rigidly connected to the carriage for engaging edges of semiconductor wafers in the first wafer cassette and pushing them out of the first wafer cassette into the second wafer cassette, and a second wafer pushing member rigidly connected to the carriage for engaging edges of semiconductor wafers in the second wafer cassette and pushing them out of the second wafer cassette into the first wafer cassette.

Claim 4 (original): The wafer transfer machine of claim 3 including a handle attached to the carriage for manually moving carriage along the track mechanism to

cause one of the first and second wafer pushing members to push wafers from one of the first and second wafer cassettes into the other.

Claim 5 (original): The wafer transfer machine of claim 3 wherein the support plate, carriage, and the first and second wafer pushing members are composed of plastic material.

Claim 6 (original): The wafer transfer machine of claim 3 wherein the track mechanism includes cylindrical first and second slide rods which are parallel to the top surface of the support plate and are parallel to each other.

Claim 7 (original): The wafer transfer machine of claim 6 wherein the carriage includes parallel first and second cylindrical holes through which the first and second slide rods, respectively, extend to allow bidirectional sliding of the carriage along the first and second slide rods.

Claim 8 (original): The wafer transfer machine of claim 3 wherein the track mechanism and carriage are underneath the support plate, and wherein the support plate includes a first elongated slot through which the first wafer pushing member extends upward to a level of wafers supported in the first wafer cassette, and wherein the support plate includes a second elongated slot through which the first wafer pushing member extends upward to a level of wafers supported in the second wafer cassette.

Claim 9 (original): The wafer transfer machine of claim 8 wherein the first and second wafer pushing members are supported by opposite ends of a push-pull rod extending through the third cylindrical hole of the carriage and rigidly attached to the carriage.

Claim 10 (original): The wafer transfer machine of claim 9 wherein the first wafer pushing member includes a first vertical section having a lower end rigidly attached to a first end section of the push-pull rod, a first horizontal section having a first end attached to and integral with an upper end of the first vertical section and also having a second end attached to and integral with a lower end of a second vertical section, and wherein the second wafer pushing member includes a third vertical section having a lower end rigidly attached to a second end section of the push-pull rod, a second horizontal section having a first end attached to and integral with an upper end of the third vertical section and also having a second end attached to and integral with a lower end of a fourth vertical section.

Claim 11 (original): The wafer transfer machine of claim 4 including an alignment knob attached to an edge of the support plate in a location aligned with the handle when the carriage is located at a center position which allows placing and removal of the first and second wafer cassettes in engagement with the first and second registration bosses, respectively, and allows removal of the first and second wafer cassettes from the support plate.

Claim 12 (original): The wafer transfer machine of claim 8 including first, second, third, and fourth legs supporting first, second, third, and fourth corner portions of the support plate, respectively, wherein opposite ends of the first slide rod engage and are supported by the first and fourth legs, respectively, and wherein opposite ends of the second slide rod engage and are supported by the second and third legs, respectively.

Claim 13 (cancelled)

Claim 14 (previously presented): A method of transferring wafers from either of a first wafer cassette and a second wafer cassette having incompatible registration features into the other wafer cassette, comprising:

(a) supporting the first wafer cassette on a support plate in registration with a first registration boss extending into and engaging a first registration feature of the first wafer cassette, and supporting the second wafer cassette on the support plate in registration with a second registration boss extending into and engaging a second registration feature of the second wafer cassette, one of the first and second wafer cassettes being loaded with semiconductor wafers and the other of the first and second wafer cassettes being empty;

wherein said first registration feature is incompatible with said second registration feature;

(b) supporting a first wafer pushing member and a second wafer pushing member by means of a carriage supported by and movable in opposite directions along a track mechanism; and

(c) moving the carriage in a direction that causes one of the first wafer pushing member and the second wafer pushing member which is closest to the semiconductor wafers in the loaded wafer cassette to engage the edges of the semiconductor wafers and push them out of the loaded wafer cassette into the empty wafer cassette.

Claim 15 (original): The method of claim 14 further including moving the carriage to a centered position that allows removal of the first and second wafer cassettes from the support plate.

Claim 16 (cancelled)

EVIDENCE APPENDIX

Appellants are submitting no items of evidence.

RELATED PROCEEDINGS APPENDIX

Appellants have no submission for the Related Proceeding Appendix.